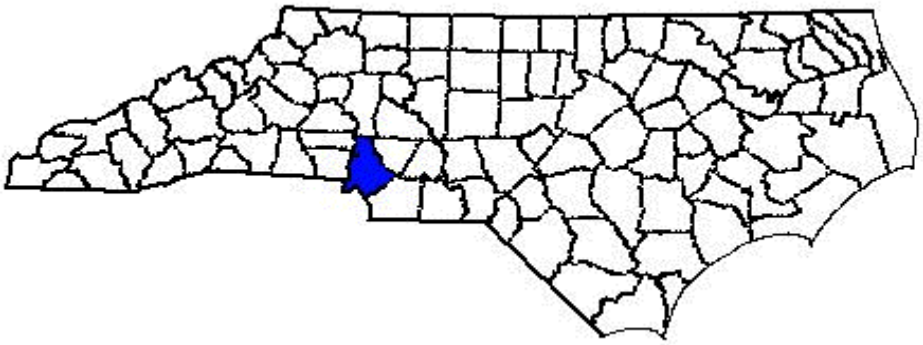
ANNUAL REPORT FOR 2003



Long Creek Mitigation Site
Mecklenburg County
Project No. 8.U672204
TIP No. R-2248

Office of Natural Environment & Roadside Environmental Unit
North Carolina Department of Transportation
December 2003

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SUMMARY

The Long Creek Mitigation Site is located in Mecklenburg County and was constructed in 1996. In order to receive mitigation credit, the site must meet jurisdictional success criteria for both wetland hydrology and vegetation for three consecutive years or until the site is deemed successful. The following report details the monitoring activities during the 2003-growing season. The 2003 data represents results from the sixth year of hydrologic monitoring and the seventh year of vegetation monitoring.

The daily rainfall data depicted on the gauge data graphs was recorded from an onsite rain gauge that was installed on May 4, 2000. Additional Charlotte rainfall data used for the 30-70 graph was provided by the NC State Climate Office. In 2003, Charlotte experienced a wet growing season, resulting in an average to above average rainfall year.

For the sixth monitoring year, seventeen of the eighteen groundwater-gauges met the success criteria for jurisdictional hydrology (saturation within 12" of the surface for greater than 12.5% of the growing season). Only one gauge reported saturation in the 5 - 8% range. All four surface water gauges indicated periodic inundation throughout the growing season.

As discussed at the 2003 annual monitoring meeting, vegetation monitoring of the Long Creek Mitigation Site has been discontinued until completion of the highway project. Upon completion of the project, vegetation monitoring will resume for one year. For the 2003-monitoring year, the site was visually monitored for vegetation. NCDOT also monitored the site for nuisance species such as red maple and sweetgum. NCDOT proposes to wait until vegetation monitoring is resumed to address this issue. At that time, nuisance species will be removed, as necessary.

NCDOT will continue to monitor the site for hydrology, in addition to the photo monitoring (vegetation), until completion of the Charlotte Outer Loop.

1.0 INTRODUCTION

1.1 PROJECT DESCRIPTION

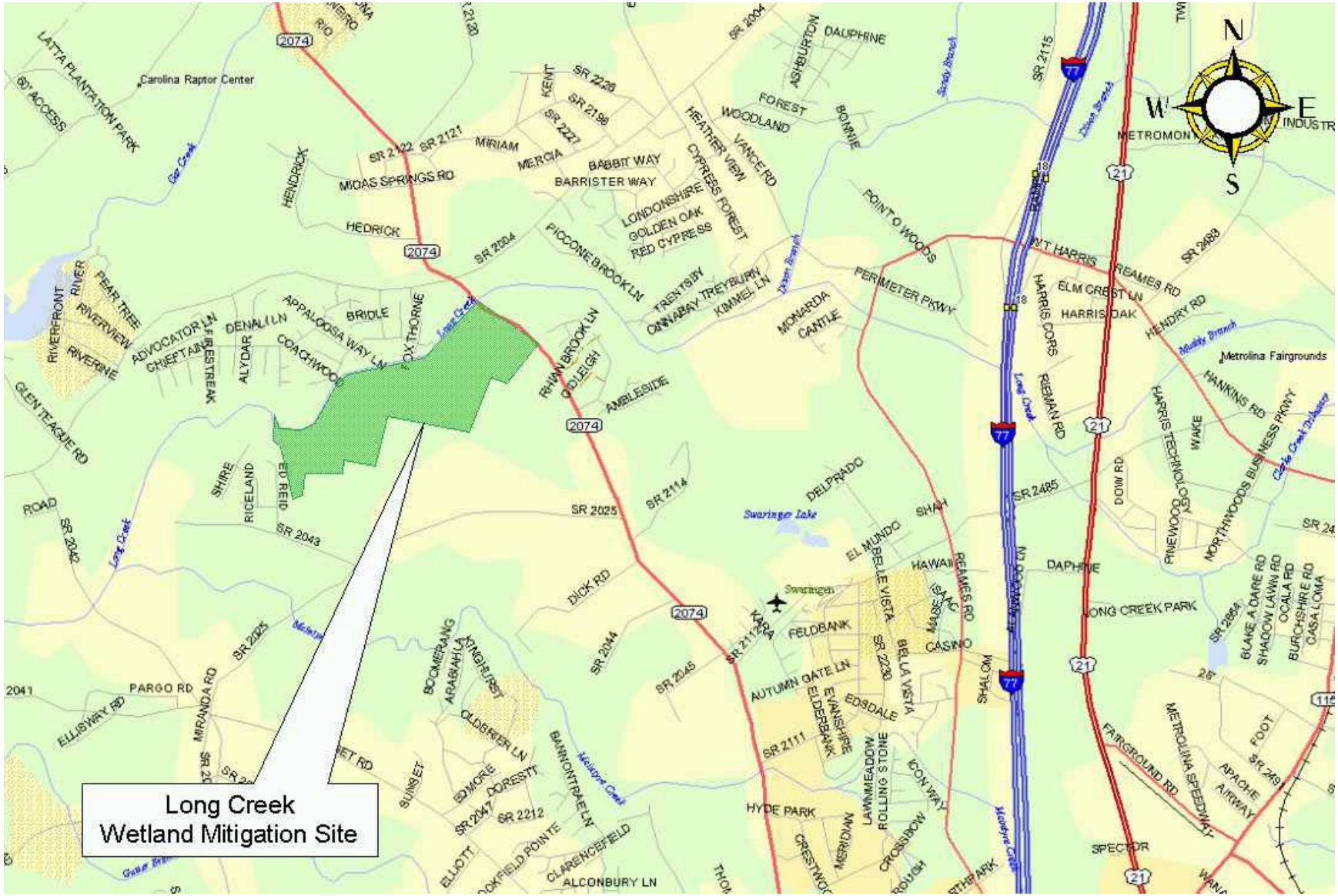
Located in Mecklenburg County, the Long Creek Mitigation Site encompasses approximately 156 acres. It is situated off of Beatties Ford Road (SR 2074) and will be bisected by the future I-485 (Figure 1). This project provides compensatory mitigation for wetland impacts associated with sections of the proposed Charlotte Outer Loop.

The Long Creek Site was designed to restore bottomland hardwood forest wetlands. It was originally constructed in December 1996, with 37 acres of the planting occurring in 1997. A five-acre portion, consisting of the former haul roads, was planted in early 1998. Groundwater, surface water, and rain gauges were installed in early 1998. The 2003-year is the sixth year of hydrologic monitoring and the seventh year of vegetation monitoring at the site.

1.2 PURPOSE

Monitoring of the Long Creek Site is required to demonstrate successful mitigation. The success of a wetland site is based primarily on federal guidelines for wetland mitigation; these guidelines include minimum standards for hydrologic conditions and vegetation survival. Both hydrologic and vegetation monitoring is conducted throughout the growing season; success criteria must be met for three consecutive years. The following report details the results of the hydrologic and vegetation monitoring for the 2003-year at the Long Creek Mitigation Site.

Figure 1. Site Location Map



1.3 PROJECT HISTORY

December 1996	Grading Construction
March 1997	Site Planted (Except 5 ac. of Haul Roads)
September 1997	Vegetation Monitoring (1 yr.)
October 1997	Monitoring Gauges Installed
March 1998	Haul Roads Planted
March- November 1998	Hydrologic Monitoring (1 yr.)
September 1998	Vegetation Monitoring (2 yr.)
March- November 1999	Hydrologic Monitoring (2 yr.)
September 1999	Vegetation Monitoring (3 yr.)
March- November 2000	Hydrologic Monitoring (3 yr.)
September 2000	Vegetation Monitoring (4 yr.)
March 2001	Site Maintenance
March- November 2001	Hydrologic Monitoring (4 yr.)
June 2001	Vegetation Monitoring (5 yr.)
March- November 2002	Hydrologic Monitoring (5 yr.)
August 2002	Vegetation Monitoring (6 yr.)
March- November 2003	Hydrologic Monitoring (6 yr.)
October 2003	Photo Monitoring (7 yr.)

1.4 DEBIT LEDGER

Table 1. Long Creek Mitigation Site Debit Ledger

Long Creek	Mit. Plan			TIP DEBIT	TIP DEBIT	TIP DEBIT	TIP DEBIT	TIP DEBIT	TIP DEBIT
Habitat	Acres At Start:	Acres Remaining	Percentage Remaining	R-211,2123,2248	R-2123 AB/BA/BB/CB	U-2506	R-2248 AB,BA	R-2123	R-2248AC/AD/BA
SPH Restoration / Creation	42.9	1.64	3.82	7.2	15	9.8	2.54	1.6	5.12
TOTAL	42.9	1.64	3.82						

SPH: Swamp Hardwood

2.0 HYDROLOGY

2.1 SUCCESS CRITERIA

In accordance with federal guidelines for wetland mitigation, the success criteria for hydrology state that areas must be inundated or saturated (within 12 inches of the surface) by surface or groundwater for at least a consecutive 12.5% of the growing season. Areas inundated for less than 5% of the growing season are always classified as non-wetlands. Areas inundated between 5% and 12.5% of the growing season can be classified as wetlands depending upon such factors as the presence of wetland vegetation and hydric soils.

The growing season in Mecklenburg County begins March 22 and ends November 11 (235 days). These dates correspond to a 50% probability that air temperatures will not drop below 28°F or lower after March 22 and before November 11.[1] Minimum wetland hydrology is required for at least 12.5% of this growing season; for Mecklenburg County, 12.5% equals 29 consecutive days. Local climate must represent average conditions for the area.

2.2 HYDROLOGIC DESCRIPTION

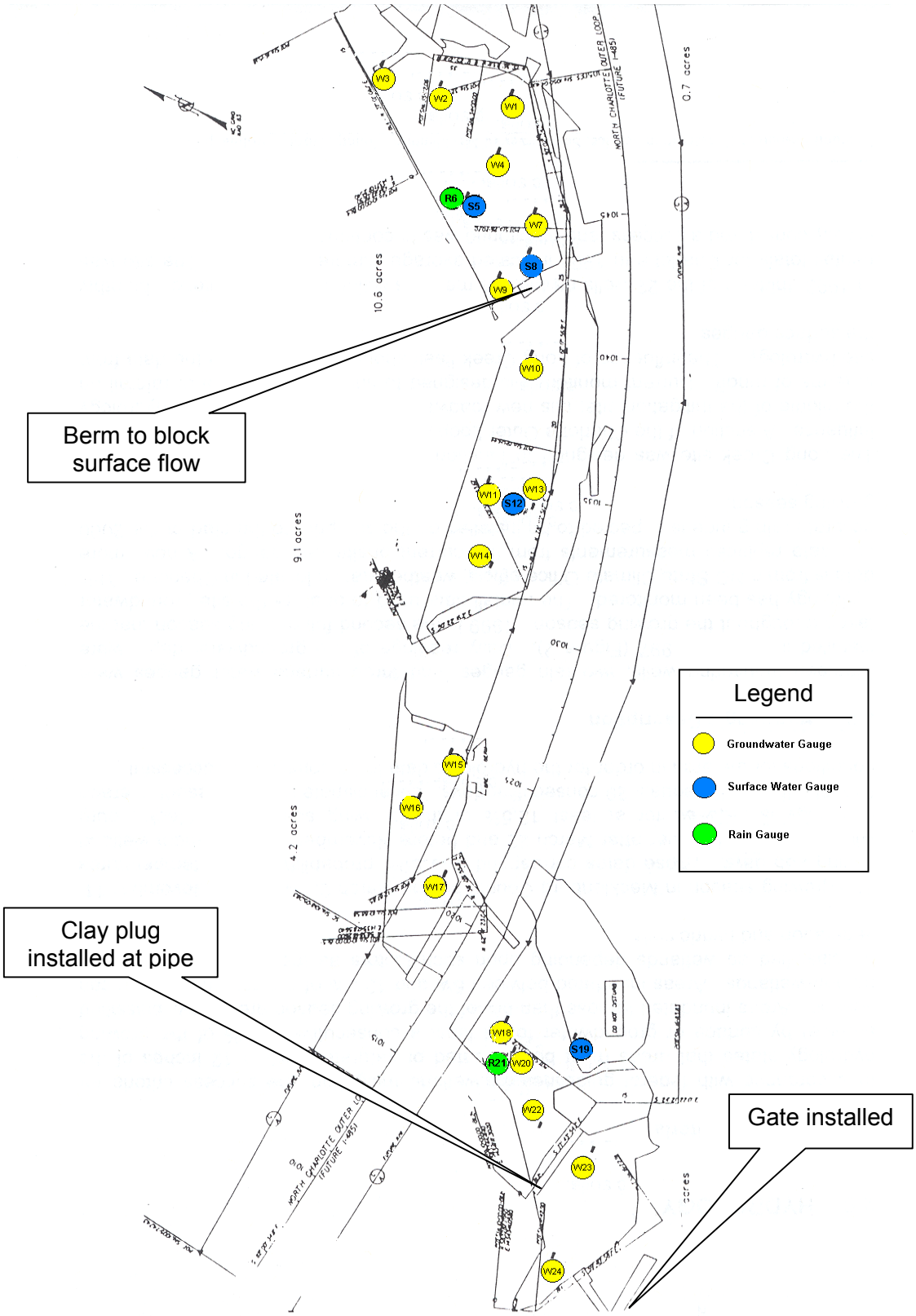
Eighteen groundwater gauges, four surface water gauges, and two rain gauges were installed in October 1997 (Figure 2). Daily readings of the groundwater depth were taken throughout the growing season. The 2003-year is the sixth full growing season that the hydrology has been monitored. The rainfall data used to analyze the site's water level data is from onsite rain gauges.

The Long Creek Site was designed to function with rainfall as its primary hydrologic influence. Per the original mitigation plan for this site, a section of the Charlotte Outer Loop is scheduled for construction through the middle of the mitigation site. This new roadway should improve the hydrology of the site through the addition of runoff. Monitoring will continue through the construction phase of I-485 in order to determine whether this work will have any adverse effects on the mitigation site. Current monitoring is designed to show the influence of rainfall on site hydrology. The influence of Long Creek itself should be reflected in the data from the surface gauges.

During a site visit in February 2001, a swale and a pipe were determined to be draining two areas of the site. Both drainage issues were addressed in March 2001. Maintenance work was done to stop water from leaving the site by constructing a berm perpendicular in the swale and by placing a clay plug at the inlet of the cross pipe in March 2001.

[1] Natural Resources Conservation Service, Soil Survey of Mecklenburg County, North Carolina, p.61.

Figure 2. Long Creek Site Gauge Location Map



2.3 RESULTS OF HYDROLOGIC MONITORING

2.3.1 Site Data

The maximum number of consecutive days that the groundwater was within twelve inches of the surface was determined for each gauge. This number was converted into a percentage of the 235-day growing season. The results are presented in Table 2.

Appendix A contains charts of the water depth for each groundwater and surface gauge. Precipitation is shown on each graph as bars. These graphs show the reaction at each monitoring location of the groundwater level to specific rainfall events. The maximum number of consecutive days is noted on each graph.

The placement of the groundwater gauges and a graphical representation of the hydrologic monitoring results are provided in Figure 3.

Table 2. 2003 Hydrologic Monitoring Results – Groundwater Gauges

Monitoring Gauge	<5%	5-8%	8-12.5%	>12.5%	Actual %	Dates of Success
LCW-1				✕	54.9	March 22-July 28
LCW-2				✕	21.7	March 22-May 11
LCW-3				✕	22.6	March 22-May 13 May 22-June 23
LCW-4				✕	22.1	March 22-May 12 May 22-June 22
LCW-7				✕	22.6	March 22-May 13 May 16-June 24
LCW-9		✕			5.5	
LCW-10				✕	14.9	March 22-April 25
LCW-11				✕	41.3	March 22-June 26
LCW-13				✕	40.9	March 22-June 25
LCW-14				✕	22.1	March 22-May 12 May 22-June 23
LCW-15				✕	40.4	March 22-June 24
LCW-16				✕	22.1	March 22-May 12
LCW-17				✕	41.3	March 22-June 26
LCW-18				✕	17.4	March 22-May 1
LCW-20				✕	17	April 4-May 13 May 22-June 24
LCW-22				✕	41.7	March 22-June 27
LCW-23				✕	22.1	March 22-May 12 May 19-June 23
LCW-24				✕	35.3	April 4-June 25

* The 2003 growing season experienced average to above average rainfall.

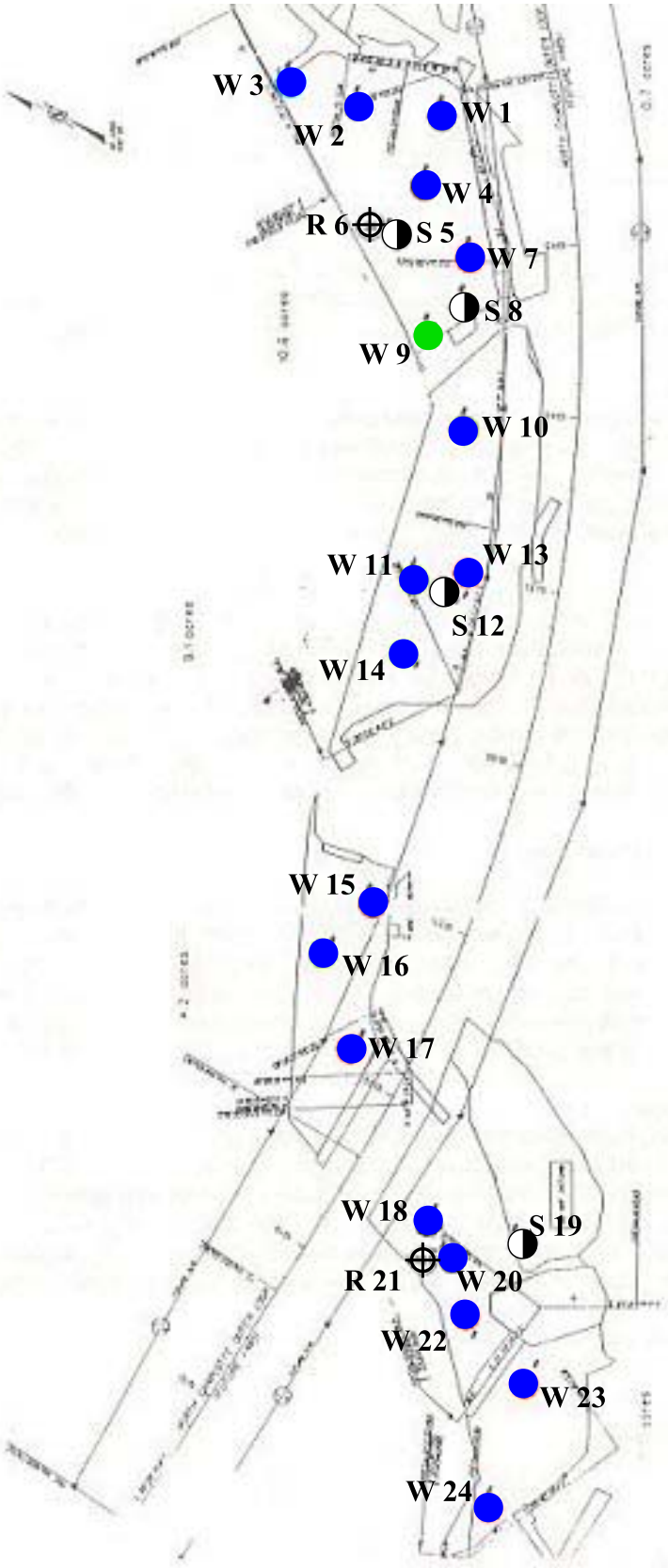


Figure 3. 2003 Hydrologic Monitoring Gauge Results

Hydrology Results
- < 5%
- 5 - 8%
- 8 - 12.5%
- > 12.5%

Rain Gauge
Surface Gauge

N

Not to Scale

2.3.2 Climatic Data

Figure 4 is a comparison of 2002 and 2003 monthly rainfall to historical precipitation for the area. This comparison indicates if 2003 was “average” in terms of climate conditions by comparing the rainfall to that of historical rainfall (data collected between 1972 and 2003). The NC State Climate Office provided all historical data.

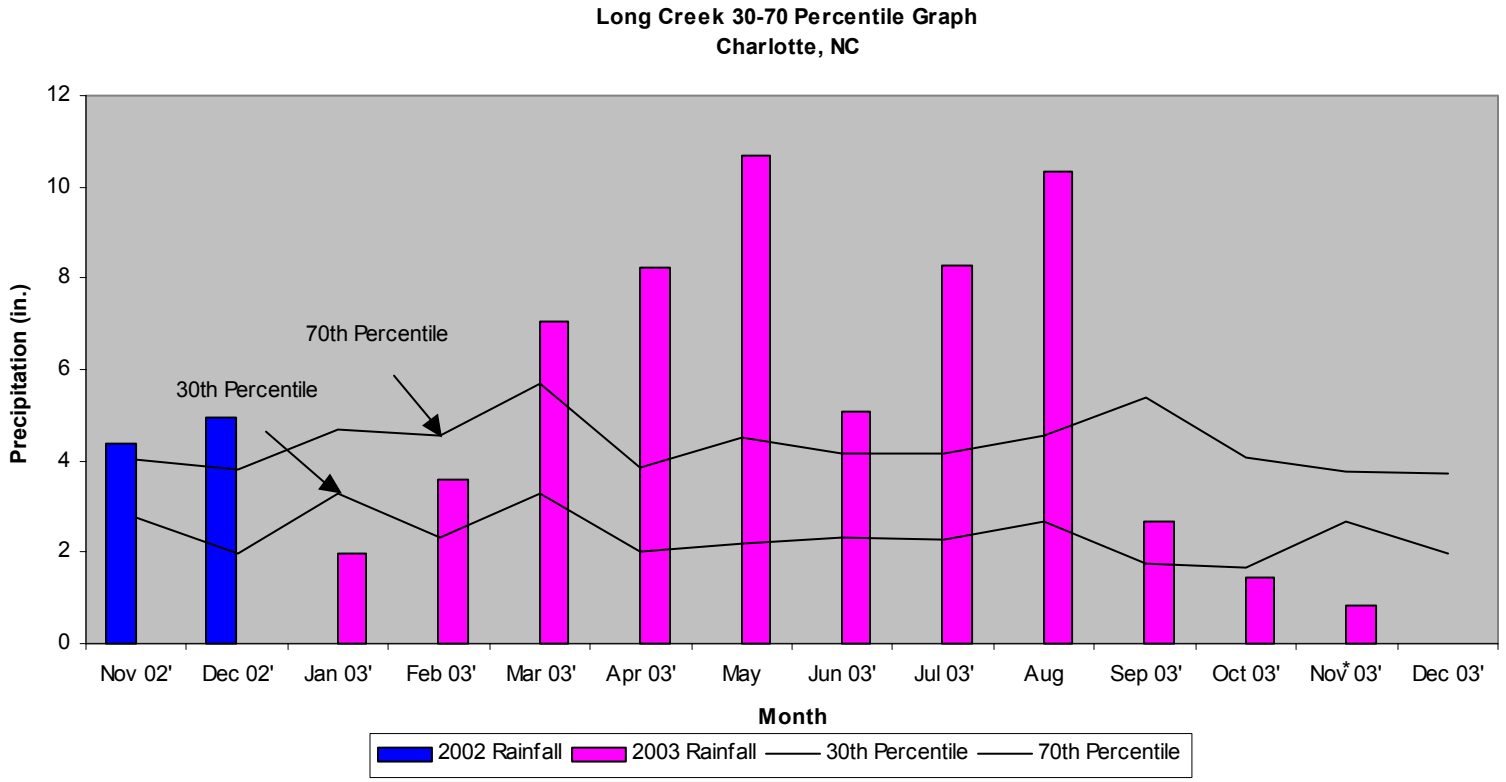
For the 2003-year, November (02’), December (02’), March, April, May, June, July, and August experienced above average rainfall. The months of January, October, and November recorded below average rainfall for the site. February and September experienced average rainfall. Overall, 2003 experienced an average to above average rainfall year.

2.4 CONCLUSION

For the sixth monitoring year, seventeen of the eighteen groundwater-gauges met the success criteria for jurisdictional hydrology (saturation within 12” of the surface for greater than 12.5% of the growing season). Only one gauge reported saturation in the 5 - 8% range. All four surface water gauges indicated periodic inundation throughout the growing season.

NCDOT proposes to continue hydrologic monitoring until the completion of the highway project (Charlotte Outer Loop).

Figure 4. 30-70 Percentile Graph



3.0 VEGETATION: LONG CREEK MITIGATION SITE (YEAR 7 MONITORING)

3.1 SUCCESS CRITERIA

Success criteria state that there must be a minimum mean density of 320 trees per acre of approved target species surviving for at least three years.

3.2 DESCRIPTION OF SPECIES

The following tree species were planted in the Wetland Restoration Area:

Fraxinus pennsylvanica, Green Ash

Fraxinus caroliniana, Carolina Ash

Betula nigra, River Birch

Quercus phellos, Willow Oak

Liriodendron tulipifera, Tulip Poplar

Quercus michauxii, Swamp Chestnut Oak

Quercus falcata var. *pagodaefolia*, Cherrybark Oak

Ulmus americana, American Elm

3.3 RESULTS OF VEGETATION MONITORING

As discussed at the 2003 annual monitoring meeting, vegetation monitoring of the Long Creek Mitigation Site has been discontinued until completion of the highway project. Upon completion of the project, vegetation monitoring will resume for one year. For the 2003-monitoring year, the site was visually monitored for vegetation. NCDOT also monitored the site for nuisance species such as red maple and sweetgum. NCDOT proposes to wait until vegetation monitoring is resumed to address this issue. At that time, nuisance species will be removed, as necessary.

3.4 CONCLUSIONS

Approximately 37 acres of this site were planted in bottomland hardwoods in March 1997. The remaining 5 acres of the site were planted in March 1998. There were six vegetation-monitoring plots established throughout the planting areas.

NCDOT will continue photo monitoring at the Long Creek Mitigation Site.

4.0 OVERALL CONCLUSIONS AND RECOMMENDATIONS

For the sixth monitoring year, seventeen of the eighteen groundwater-gauges met the success criteria for jurisdictional hydrology (saturation within 12" of the surface for greater than 12.5% of the growing season). Only one gauge reported saturation in the 5 - 8% range. All four surface water gauges indicated periodic inundation throughout the growing season.

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NCDOT will continue to monitor the site for hydrology, in addition to the photo monitoring (vegetation), until completion of the Charlotte Outer Loop.

APPENDIX A

GAUGE DATA GRAPHS

APPENDIX B

SITE PHOTOS & VEGETATION PLOT LOCATIONS

LONG CREEK

Photo 1

Photo 2

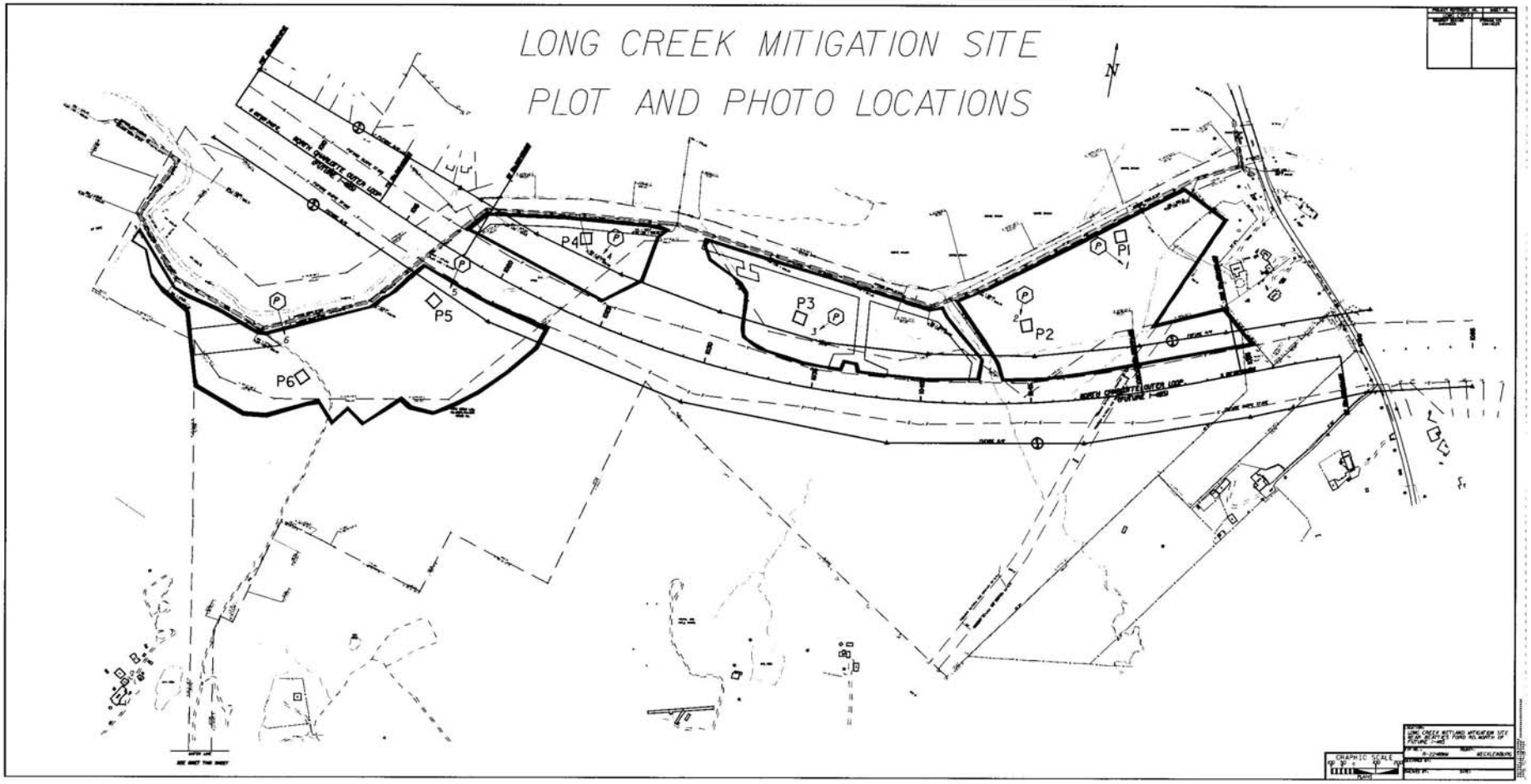
Photo 3

Photo 4

Photo 5

Photo 6

2003


LONG CREEK MITIGATION SITE
PLOT AND PHOTO LOCATIONS
N
P1
P2
P3
P4
P5
P6
NORTH CHARLOTTE OUTER LOOP
FUTURE I-485